

AR41



glass containers & the environment

pollution in perspective

AUG 24 1972

Household and commercial wastes, the garbage normally collected by a municipality for disposal, are only part of the overall solid waste problem in Canada. But because it is that part of solid waste with which we are most familiar, it has received a great deal of attention from environmental groups and the news media.

Household and commercial garbage represents only 1.7 per cent of all solid waste generated in Canada each year. And solid waste is, of course, only one part — and by no means the most important part — of our total problem of air, water and land pollution.

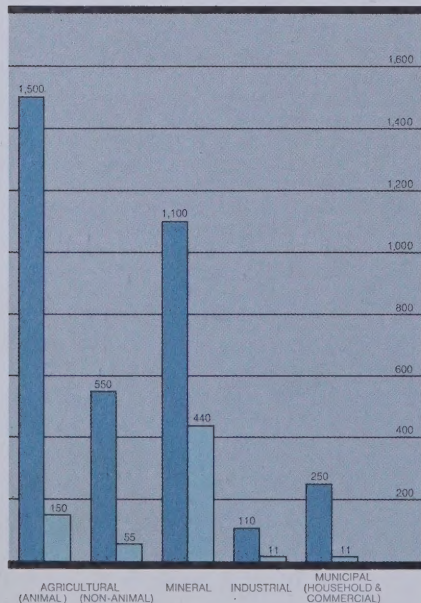
What is important about the solid waste problem is the fact that millions of tons of precious non-renewable natural resources are being “disposed” of annually through burning or burying. Experts agree that we must learn to recycle these resources, in the largest quantities possible, as quickly as we can.

The answer lies in the development of a system designed not to “dispose” of solid waste, but to segregate it into its components for recycling. Aluminum, steel, paper and glass are materials which can be recycled while food wastes can be turned into a sanitary compost for use in reclaiming what are now waste or despoiled lands.

Solid waste

(MILLIONS OF TONS)

UNITED STATES
CANADA



There are four basic types of solid waste which must be dealt with — municipal, industrial, agricultural and mineral. The following table and graph compare Canadian with U.S. statistics on the annual generation of solid waste in each of these categories.

| | U.S. | | Canada | |
|------------------------------------|-------|-------------------------|--------|-------|
| | | (millions of tons/year) | | |
| | | % | | % |
| Municipal (household & commercial) | 250 | 7.1 | 11 | 1.7 |
| Industrial | 110 | 3.1 | 11 | 1.7 |
| Agricultural (animals) | 1,500 | 42.7 | 150 | 22.5 |
| Agricultural (non-animals) | 550 | 15.7 | 55 | 8.2 |
| Mineral | 1,100 | 31.4 | 440 | 65.9 |
| TOTAL | 3,510 | 100.0 | 667 | 100.0 |

Sources: See Bibliography Nos. 5, 9 10.

Since municipal solid waste is the only portion in which glass containers are present, we will limit our discussion to these wastes only, which represent 1.7 per cent of the total.

municipal solid waste

Everything man produces or consumes is useful for a relatively brief period of time and, when its usefulness is at an end, it must be disposed of.

Current estimates indicate that each citizen of the United States generates approximately 1800 pounds of residential and commercial solid waste per year.

Canadians generate approximately 1000 pounds of domestic and commercial solid waste per person per year or 2.74 pounds per day.

Following is a tabulation of various materials which make up domestic and commercial (municipal) solid waste in Canada.

Municipal solid waste (Percentage by Weight)

| CITY | Paper | Food Wastes | Metal | Glass & Ceramics | Wood | Plastics & Synthetics | Misc. |
|----------------|-------|-------------|-------|------------------|------|-----------------------|-------|
| CALGARY | 85.0 | 5.5 | 1.5 | 3.4 | 1.0 | 2.0 | 1.6 |
| ST. CATHARINES | 60.0 | 20.0 | 5.0 | 5.0 | — | 5.0 | 5.0 |
| MONTREAL | 50.1 | 31.6 | 6.1 | 4.08 | 2.9 | 2.3 | 2.86 |
| TORONTO | 39.5 | 32.4 | 5.9 | 8.0 | 1.1 | 4.1 | 9.0 |
| VANCOUVER | 36.4 | 28.0 | 8.2 | 7.2 | 14.9 | 4.7 | 3.6 |
| KITCHENER | 48.0 | 16.0 | 8.0 | 6.0 | — | 1.0 | 22.0 |
| AVERAGE | 53.1 | 22.2 | 5.8 | 5.6 | 4.8 | 3.2 | 7.3 |

Sources : See Bibliography Nos. 5, 7, 9 et 10.

No attempt has been made to justify the figures in this table. They are reproduced here as reported by the municipalities concerned. Totals add up to 102 per cent.

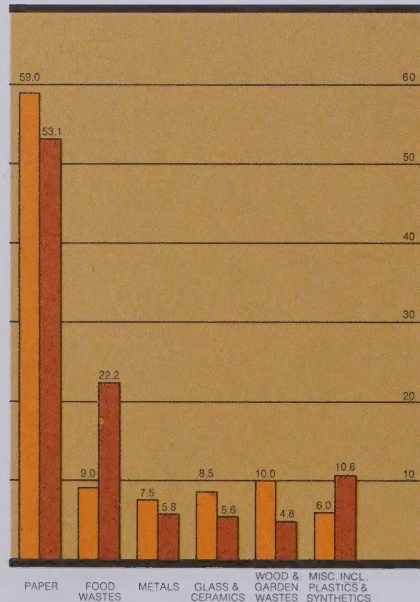
composition of municipal solid waste

4

Municipal Solid Waste

(PERCENTAGE BY WEIGHT)

UNITED STATES
CANADA



Composition of municipal solid waste

| MATERIAL | Percentage by Weight | |
|--|----------------------|--------|
| | U.S. | Canada |
| Paper ¹ | 59.0% | 53.1% |
| Food wastes | 9.0 | 22.2 |
| Metals | 7.5 | 5.8 |
| Glass & Ceramics ² | 8.5 | 5.6 |
| Wood, lawn & garden wastes | 10.0 | 4.8 |
| Plastics and synthetics, clothes, rags, rubber, leather, etc. ³ | 6.0 | 10.6 |

Sources: See Bibliography Nos. 1, 5, 7, 9, 10.

1 — In the survey by the American Society of Civil Engineers (See Bibliography No. 1), paper is further broken down into the following categories:

| | Percentage by Weight |
|----------------------------|----------------------|
| Corrugated paper boxes | 25.70% |
| Newspapers | 10.34 |
| Magazine paper | 7.47 |
| Brown paper | 6.13 |
| Mail | 3.02 |
| Paper food cartons | 2.27 |
| Tissue paper | 2.18 |
| Plastic coated & wax paper | 1.68 |
| | 58.79 |

2 — The figures for glass include window and other flat glass and ceramics (dishes and tableware). Discounting the quantities of flat and plate glass and ceramics, container glass represents about 4.5 per cent of municipal solid waste in Canada.

3 — Present estimates indicate that approximately 700,000 automobiles and trucks are disposed of in Canada each year, representing (at an approximate weight of two tons each) about 1,400,000 tons which must be added to the total of municipal solid waste.

glass containers & the environment

Glass is made of highly abundant raw materials; silica sand, limestone and soda ash. Sand accounts for 73 per cent of the materials in container glass. Thus, glass manufacturing is not a serious drain on our natural resources. In fact, the raw materials used in the manufacture of container glass are used in approximately the same proportions in which they are found in the earth's crust.

Glass is inert — it does not leach, rust, rot, mould, putrefy, cause disease or give off noxious gases, nor pollute in any way.

If properly crushed in disposal processes, the glass fragments return to the soil in virtually their original state.

Glass, as a material, is not a problem in present waste disposal systems. This fact has been confirmed by a survey of 750 public works officials conducted by the Resources Management Corporation in the U.S.A. A similar survey of 21 major Canadian cities confirms that glass poses no particular problems in present solid waste disposal systems. (See Bibliography No. 9)

Preliminary findings in studies being conducted by the Drexel Institute of Technology on the performance of glass containers in sanitary landfill indicate that, if glass is properly crushed, its volume is reduced to a minimum and there is no significant leaching.

Glass contributes to a firm landfill and does not contribute to water pollution.

Glass containers readily break up in the incineration process to help aerate the furnace charge, thus contributing to efficient combustion.

As glass is inert, it cannot contribute to air pollution in the incineration process.

In composting, crushed glass provides a valuable soil conditioner.

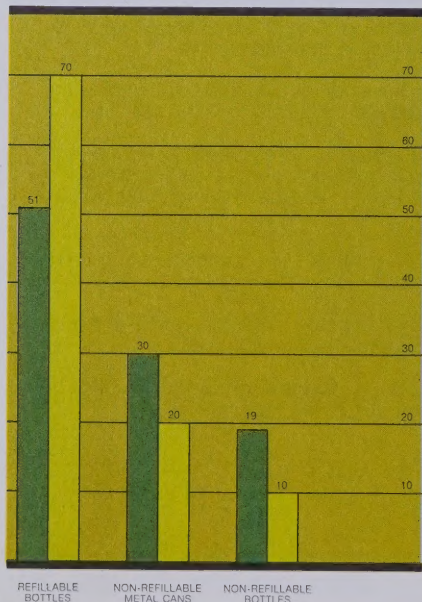
Of all manufactured products, glass is the most easily recyclable.

glass containers & the soft drink industry

Containers in soft drink industry

(PER CENT OF TOTAL — 1971)

UNITED STATES
CANADA



Sales of soft drinks by container classification during 1971 were as follows:

| | U.S. | Canada |
|---------------------------|------|--------|
| Refillable bottles | 51% | 70% |
| Non-refillable metal cans | 30% | 20% |
| Non-refillable bottles | 19% | 10% |

Non-refillable bottles are made of exactly the same kind of glass as refillable bottles. There is no plastic in non-refillable bottles — so they can be crushed and reused in making new containers and other products as easily as refillable bottles.

There are more than 10,000 food and drink items for sale in our supermarkets. Soft drinks are the only products which the consumer can purchase in refillable containers.

Over the past ten years, the average growth of total glass container shipments has been only five per cent per year. This is about equal to that of the overall packaging industry. So it cannot be said that glass containers are making, or will make, a disproportionate contribution to litter or solid waste.

Non-refillable soft drink bottles account for approximately 0.45 per cent of municipal solid waste.

Non-refillable soft drink bottles account for approximately 0.4 per cent of roadside litter.

In 1960 all soft drinks bottled in Canada were in refillable bottles and at that time the bottler got an average of 20 trips — 20 refills — out of each bottle. But throughout the '60's trippage dropped in some cases from 20 to 10 and in extreme cases to 5 or less.

What happened? It seems that many consumers were using the more expensive refillable bottles as if they were one-way metal containers.

Because some consumers stopped returning refillable bottles and trippage plummeted, many bottlers were forced by economic necessity to convert their equipment to handle one-way containers.

The economics of the returnable system were based on the co-operation of manufacturer, retailer and consumer. As long as the consumer and retailer co-operated, the returnable system functioned well. Without this co-operation, its continued existence was jeopardized.

solid waste management

The Glass Container Council of Canada has followed and participated in a number of research and development programs aimed at finding solutions to the solid waste problem. We have reached the conclusion that solutions are available now.

The technical equipment necessary to sort raw garbage is presently available on the market.

Many materials, such as paper, aluminum, steel, other metals and glass can be recycled now — the technology is available. What is lacking is an assured supply of raw materials in the form of waste paper, aluminum, steel, other metals and glass. Once the supply is established, markets can readily be developed — paper back to the mill, aluminum and steel back to the smelters, and glass back to the glass plants.

The raw material supplies are presently available in domestic and commercial wastes.

The solution, we believe, lies in three easily definable areas :

- 1 — Waste collection which is material handling
- 2 — Waste sorting and separation which is technical and mechanical
- 3 — Reprocessing and recycling which is manufacturing and no problem if the first two can be solved.

In short, a large part of refuse represents resources out of place. We can and we must recover these resources as quickly as possible.

The Glass Container Council of Canada, representing glass container manufacturers and their suppliers, has lent both financial and technical support to a Solid Waste Reclamation Plant designed by Dr. R.H. Clark and Dr. J.H. Brown of Queen's University, Kingston, Ontario.

The \$1.4 million reclamation plant will serve as a prototype unit in Canada — a first step in determining and developing the potential value of municipal wastes such as paper, ferrous and non-ferrous metals, glass, food wastes and compost.

Engineering design work by J.D. Paterson and Associates Limited and J.L. Richards and Associates Limited, both of Ottawa, has been completed and an option has been taken on a plant site in an industrial park in Kingston, Ontario. The Kingston City Council has heartily endorsed the project which could be in operation within twelve months of the start of construction.

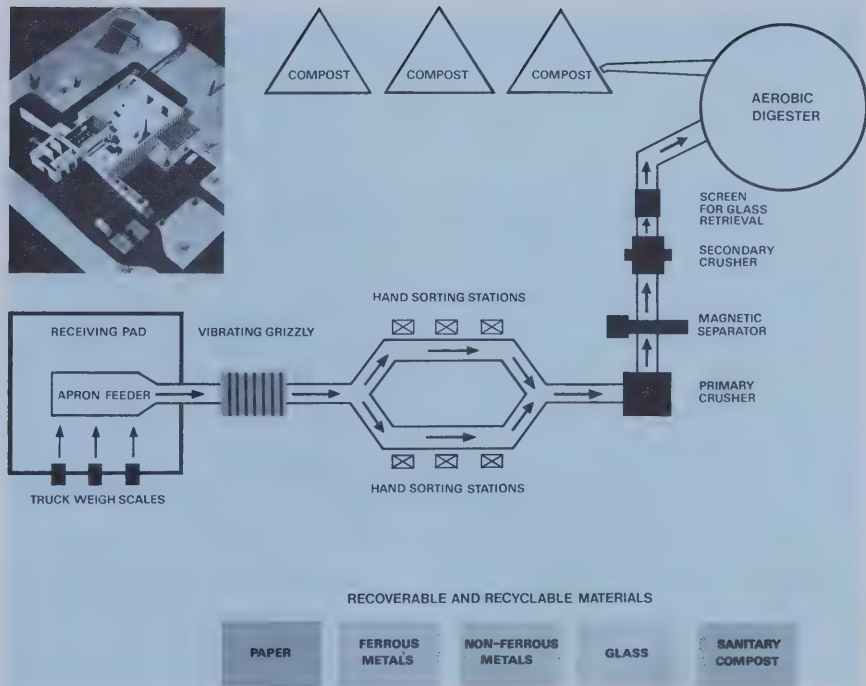
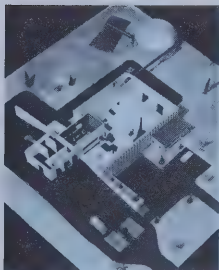
The reclamation system in the Kingston plant will not employ processes or operations requiring prior physical research; the system will use only technology proven either in disposal operations or in reasonably related fields such as bulk materials handling. The main feature of the Kingston system will be in the combination of processes involved.

For example, the treatment of non-recoverable biodegradable materials such as food waste would use a well-proven composting system which produces a genuinely sanitary product. This system has proven to be highly flexible and reliable in practice.

"We see the Kingston plant not only as a viable operating unit in the reclamation field, but as an ongoing research and development centre in the field of municipal waste disposal", commented H.E. Dalton, Executive Director of the Glass Container Council of Canada.

kingston reclamation plant

9



the many lives of a glass container

10

Because of its unique physical and chemical properties, glass is theoretically recyclable forever. Through procedures that are keyed essentially to heating and cooling, glass can be reprocessed repeatedly without impairment.

The glass in today's peanut butter jar may become part of the glass in tomorrow's wine bottle. Or it may become one of several secondary products.

Glass containers salvaged from solid waste are becoming a raw material of value. Potential uses being developed for waste container glass might possibly require more discarded bottles and jars than the nation's total refuse accumulation could provide, now or in the predictable future.

New bottles from old

The most immediate practical use for reclaimed container glass is in the manufacture of new glass containers.

Old jars and bottles are an important source of cullet — crushed glass that is added to the sand and other raw materials that constitute the glass furnace "batch". Glass container manufacturers previously used cullet for about 5 per cent of their raw materials mix. Now they are using

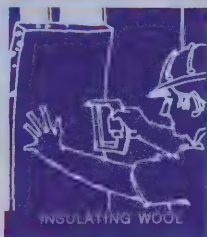
as much as 20-25 per cent. Research indicates that cullet could eventually provide 50 per cent or more of the raw materials used in the manufacture of glass jars and bottles.

Materials for building homes

The general construction industry is expected to provide a significant market for reclaimed glass containers.

One answer to the oft-heard cry of why can't we solve environmental problems on earth when we can land men on the moon was revealed in Fullerton, California with the announcement that three new building products containing large amounts of salvaged glass from discarded containers were incorporated in a new industrial park development.

Actually a "glass reclamation showcase", the Fullerton Air Industrial Park will serve as an experimental base designed to test technological and marketing theories for various uses of recycled glass products such as those that are used in the development.



Glass Containers Corporation and Orco Block Company of Stanton, California, jointly developed the glass cement block that was used in the construction of two sections of walls. Glass cullet comprises approximately 30% of the mixture used in the blocks.

Utilizing basic research conducted by the U.S. Bureau of Mines, a standard five-eighths-inch terrazzo floor was developed substituting reclaimed glass for marble chips.

In addition to the regular thickness floor, a second type using glass but featuring a new type matrix was also laid. It incorporates small amounts of polymer substance that enables terrazzo floors to be laid thinner, resulting in significant weight savings, a major factor in high-rise buildings. It also has two to three times the flexible strength of normal terrazzo.

The glass wool insulation was jointly developed by Sealtite Insulation Manufacturing Company and Glass Containers Corporation. It uses a 50% glass cullet base compared with a slag base normally used in the patented insulation. The Sealtite Company said, "Although we really don't know all the benefits that will come from using a greater percentage of cullet, tests made by an

independent laboratory have already shown the new insulation material has twice the resistance to moisture retention as competing products and that sound-deadening characteristics and the insulation value prove at least equal to other types of insulation."

Other secondary products

Because of its chemical stability, salvaged glass is proving itself an ideal raw material for vitrified soil-pipe, which must be impervious to the acids in the wastes it carries away as well as to the moisture and chemicals in the earth that surrounds it.

Glass recovered from old bottles may help prevent accidents and save lives on high-speed turnpikes. The glass, formed into tiny beads, becomes an important part of reflective paints. These paints glow in the dark when the headlight beam of an oncoming vehicle strikes them. They are used on highway signs, on the painted strips of pavement that separate one traffic lane from another, and on roadside markers.

bottle redemption & recycling program

Starting with three depots on a trial basis during the summer of 1970, eleven bottle redemption and recycling depots are presently in operation at glass container manufacturing plants in Canada. During 1971, these depots purchased from individuals and groups a total of 14.5 million containers which were recycled into new bottles.

Bottles accepted at the recycling centres must be reasonably clean and sorted by colour. Paper labels are no problem but aluminum neck rings, other metals and plastics must be removed, since the bottles will be melted down and made into new containers and metal would contaminate the new glass.

Glass container manufacturers purchase all used bottles and jars brought in by individuals and non-profit organizations to the recycling depots listed on the following page. The payment for redeemed glass is 1/2¢ per container or \$15.00 per ton in bulk.



location of bottle recycling depots

Ahlstrom Canada Limited,
Scoudouc (Moncton), New Brunswick.
Please contact: L. Bungey
Telephone: (506) 532-4446

Consumers Glass Company Limited,
85 Montcalm Street, N.,
Candiac, Quebec.
Please contact: F. McCheyne
Telephone: (514) 489-9361

Dominion Glass Company Limited,
2376 Wellington Street,
Montreal, Quebec.
Please contact: R. Harel
Telephone: (514) 933-7331

Consumers Glass Company Limited,
258 - 2nd Avenue,
Ville St-Pierre, Quebec.
Please contact: F. McCheyne
Telephone: (514) 489-9361

Consumers Glass Company Limited,
777 Kipling Avenue,
Etobicoke, Ontario
Please contact: N. Kiernander
Telephone: (416) 239-7151

Dominion Glass Company Limited,
100 West Drive,
Bramalea, Ontario
Please contact: S. Collins
Telephone: (416) 457-2423

Dominion Glass Company Limited,
Chapple Street,
Hamilton, Ontario.
Please contact: D. Shaw
Telephone: (416) 544-3741.

Dominion Glass Company Limited,
1250 James Street,
Wallaceburg, Ontario.
Please contact: B. Massey
Telephone: (519) 627-2271

Dominion Glass Company Limited,
1st Avenue & 1st Street N.E.,
Redcliff, Alberta.
Please contact: W.J. Sellhorn
Telephone: (403) 548-3901

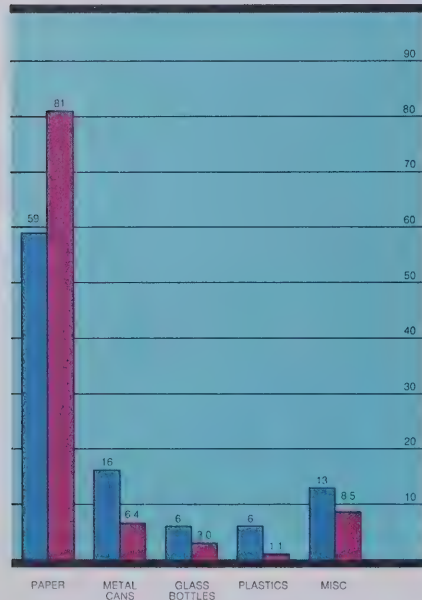
Consumers Glass Company Limited,
Lavington, British Columbia.
Please contact: H. McConnell
Telephone: (604) 545-2301

Dominion Glass Company Limited,
6850 - 20 th Avenue,
Burnaby, British Columbia.
Please contact: J.M. Katrusiak
Telephone: (604) 526-4611

Composition of litter

(PERCENTAGE BY ITEM COUNT)

UNITED STATES
CANADA



Litter is anything people discard in the wrong place.

People have been littering since the dawn of history.

The citizens of ancient Rome were warned that littering could lead to fines or corporal punishment.

Shakespeare's father was fined for littering a street in Stratford, England.

A Boston newspaper in 1874 condemned the actions of litterbugs at an Independence Day parade.

Many studies have been made both in Canada and the United States to find out just what litter is. Such surveys, conducted by research organizations, high school and university students and members of environmental groups are in basic agreement concerning the proportion of various items found in litter:

Composition of litter

| | Canada | U.S. |
|--|--------|-------|
| Paper (newspapers, containers, wrappers, cartons) | 81.0% | 59.0% |
| Cans (food, beer, soft drink & others) | 6.4% | 16.0% |
| Glass bottles and jars (food & beverage) | 3.0% | 6.0% |
| Plastics (containers and misc.) | 1.1% | 6.0% |
| Miscellaneous (rubber tires, auto parts, footwear, clothing, etc.) | 8.5% | 13.0% |

Almost everybody litters at one time or another — but only people litter.

People sometimes put the blame on the inanimate objects that become litter. But a used-up package just isn't up to it.

Why do people litter?

They are careless, thoughtless, inconsiderate and lazy.

They have little sense of responsibility.

They don't carry litterbags in their cars or boats.

There are too few litter baskets along streets and highways, at beaches, campsites and picnic grounds.

Laws against littering are not enforced.

People are generally indifferent toward the culprits.

Can littering be stopped?

Most concerned persons agree that there are three basic ways to lessen littering:

1 — **Public education** to teach people that littering is harmful, costly and wrong. To teach people that littering is a socially unacceptable habit. Anti-littering educational programs have succeeded elsewhere — in Switzerland, for example, and at Expo '67, and there is no reason why they cannot be successful in every area of the country unless, of course, we are convinced that Canadians are not capable of shouldering individual responsibility for the quality of their environment — and this, most of us do not believe.

2 — **Plenty of litter baskets** in the right places — and a litterbag in every car and boat.

3 — **Strict enforcement of laws** against littering. A massive anti-littering campaign mounted in Metropolitan New York several years ago with the help of a number of advertising agencies, newspapers, radio and TV stations, increased the percentage of streets rated "clean" from 56 to 85 over a four-month period.

The organizers of the campaign concluded that those still littering must form a hard core of irresponsible barbarians who could not be reformed by amiable slogans like "Cast Your Ballot for a Cleaner New York". However, a poll taken at the end of the campaign revealed that a majority of New Yorkers were not aware that they could be fined \$25 for littering. As a result, a **tough** campaign was organized, warning litterbugs that they would be hauled into court. At the same time, the New York Sanitation Department recruited a flying squad of uniformed men to patrol the streets on motor scooters in search of offenders. Within four months 39,400 summonses had been handed out, and the magistrates did their duty by imposing a \$25 fine in each case. This is one type of action geared to make people more conscious of their own responsibility for the quality of our environment.

Ontario's anti-litter program

"The Ontario Government intends to join industries, municipalities and citizens' groups in a massive campaign against litter," Hon. James Auld, Minister of the Environment, announced in May 1972. The Minister has formed a task force on litter which will consist of members of the

Consumers' Association of Canada, Pollution Probe, government officials, the Canadian Packaging Association, the Glass Container Council of Canada and others.

"We will all be joined together to make this litter campaign work," the Minister said.

At the same time, Mr. Auld announced the start of a campaign on TV and radio to attack the litter problem in the Province of Ontario. Industries are presently working on programs to tie in with the government campaign, and the Glass Container Council is developing an educational program which it is hoped will be used in school systems throughout the province.

A few people think the way to stop littering is to outlaw the use of objects that become litter. However, if we were to outlaw or ban all the items that show up in litter the list would be a long one, and the economic effects of such action in loss of jobs alone would be incalculable.

is legislation the answer

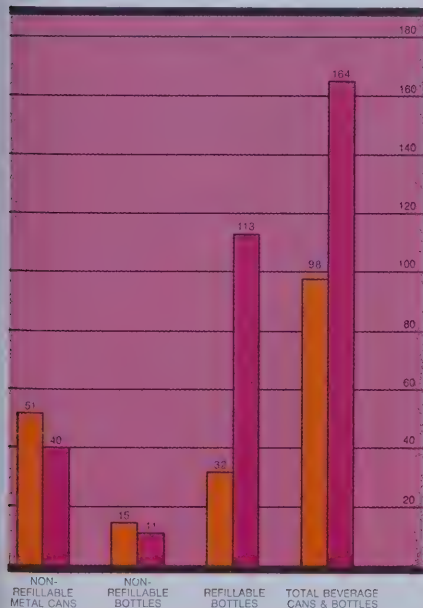
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Effects of legislation on litter

(BEVERAGE CONTAINERS ONLY)

B.C. — TABULATION OF FOUR SURVEYS IN VANCOUVER AREA

BEFORE
AFTER



The provinces of British Columbia and Alberta have passed legislation which imposes a mandatory 2¢ refund on all beverage containers. The proponents of such legislation claim the object is to clean up litter, but since the legislation affects objects which represent only 5 per cent of all litter, it can hardly have much effect.

What such legislation does is set up separate and expensive collection and disposal systems for a small number of containers without providing any benefits.

The results of such legislation are:

- 1 — loss of employment in the container manufacturing and related industries

- 2 — increased costs of handling containers which are passed on to the consumer in the form of higher prices — increases ranging up to 25 per cent
- 3 — no benefits either in the form of recycling or reduced solid waste
- 4 — no reduction in litter — as the following statistics indicate.

Canadian Research Services Limited, an independent agency, made litter surveys of four sites in the Vancouver area in August 1970, before the B.C. Litter Act came into effect, and again, at the same sites in October 1971 after the legislation had been in effect for over nine months.

Effects of legislation on litter in B.C. (beverage container portion only)

| | Non-Refillable Metal Cans | Non-Refillable Bottles | Re-fillable Bottles | Total Beverage Bottles & Cans |
|----------------------|---------------------------|------------------------|---------------------|-------------------------------|
| Before (August 1970) | 51 | 15 | 32 | 98 |
| After (October 1971) | 40 | 11 | 113 | 164 |
| Change | - 11 | - 4 | + 71 | + 66 |

Such legislative action, based on political opportunism rather than on sound reason, is not likely to help us solve our problems of air, water and soil pollution, solid waste and litter.

environmental compatibility analysis

78

Before undertaking legislative action in the field of solid waste, governments should carry out what we might call an "environmental compatibility factor analysis" of all the materials and objects which show up in solid waste in order to provide factual, realistic information on which to base priorities for the future.

Such an ECF analysis would study all components of solid waste according to some, and many more, of the following criteria:

- 1 — Known world reserves of non-renewable raw materials from which each product is made.
- 2 — Energy consumption involved at every stage of the manufacturing process including transportation of raw materials and delivery of final product to the consumer. This would be an analysis of energy consumed in the total "system" involved in the manufacture and marketing of a product, to include energy consumed in the mining of the raw materials, primary, secondary and tertiary manufacturing stages, filling and distribution.
- 3 — Air, water, soil pollution and other negative effects on the environment (such as despoliation of landscape as a result of open-pit mining; slag production) as a by-product of each stage of the manufacture of a product, including the mining, transport of raw materials, primary, secondary and tertiary manufacturing processes and transportation at every stage in the "system".
- 4 — The quantities of each product or material which end up in solid waste as a percentage of the total.
- 5 — Air, water, soil pollution and other environmental effects resulting from the disposal of each material whether by incineration, sanitary landfill, or other process.
- 6 — The ease with which each product or material can be segregated from waste and reclaimed.
- 7 — The relative ease or difficulty of recycling each product or material, including technical requirements for reuse.
- 8 — The quantity of each material or product actually being recycled after use by the consumer.
- 9 — The number of times each product or material can be recycled after use by the consumer before ultimate disposal.
- 10 — The possible ultimate extent — from a technical point of view — to which each product or material could be recycled within say ten years from now.

Such an analysis should be carried out on all consumer products starting with those which make up the largest part of solid waste since to pick on one or two items arbitrarily and legislate them out of existence would be patently unfair and discriminatory.

Glass container industry policy concerning solid waste management and litter prevention

Glass bottles and jars have been widely used by civilized peoples for 35 centuries. They were first used as containers by the ancient Egyptians. Today — 3,500 years later — they are the most commonly used of all rigid containers to package foods, beverages, drugs, chemicals, toiletries and various other essential consumer goods.

The glass container manufacturing industry — with eleven production plants in five provinces — today employs 7,700 men and women. Its annual payroll exceeds \$53 million.

The glass container industry recognizes that its products, among many others, become a part of litter and solid waste. (They account for about 4.5 per cent by weight of solid waste and about 3 per cent by item count of litter.)

The industry further recognizes that litter and solid waste present problems adversely affecting the quality of the environment.

The industry, in the light of these facts, readily accepts a responsibility for helping to resolve these environmental problems.

Solid waste management

The glass container industry is committed to the proposition that the most effective long-range solution to the solid waste problem lies in the salvage and recycling of the many components of refuse through design and application of modern technological systems. The industry holds the conviction that this solution is most commensurate with:

- 1 — Conservation of natural resources
- 2 — The preservation of environmental quality
- 3 — Improved efficiency of solid waste management.

The glass container industry is further committed to the proposition that this long-range objective can best be obtained through cooperation between government, industry and the public.

The role of government must be:

- 1 — **Federal government** — basic research to develop broad technological capabilities, funding of demonstration projects, dissemination of information on technological progress and market opportunities, and provision of incentives for community and regional waste management systems.
- 2 — **Provincial government** — Fostering development of local, regional and provincial solid waste management systems and standards, and coordination between provincial, federal and community programs.
- 3 — **Local government** — establishment and operation of improved refuse collection systems and processing centers and the provision of the community's share of funds for establishment and operation of such systems and centres.

The role of industry must be:

- 1 — Cooperation with government in the development of technology to establish improved waste collection and processing systems, such cooperation to be closely oriented to industry's

intimate knowledge of the characteristics and behavior of its products in the solid waste management cycle.

- 2 — The development of markets of sufficient magnitude to absorb the various products salvaged from solid waste.
- 3 — Cooperation with government at all levels in creating, through appropriate communications techniques, public and official opinion conducive to the establishment of modern salvage-recycle systems.

The role of the public must be:

- 1 — A factual understanding of the problems involved.
- 2 — Readiness to support programs seeking improved solid waste management systems.
- 3 — Willingness to direct the appropriation of funds for such systems.

The glass container industry as a matter of basic policy is dedicated to pursuing a seven-point program within the framework of responsibilities outlined above:

- 1 — Cooperation with other industries, individual companies and government in the development of innovative waste collection, separation and processing systems designed to close the use-salvage-recycle loop.
- 2 — The conduct and support of research that will contribute to the efficient processing of glass containers in solid waste management systems and their recycling back into production of new containers and such secondary products as glasphalt, building bricks and blocks, glass wool insulation material, aerated concrete, terrazzo flooring, vitrified soil pipe and many other products.
- 3 — Development of technology making possible recycling the maximum volume of used container glass back into the bottle making process.
- 4 — Development independently and in cooperation with other industries and government of secondary products using waste container glass.

5 — Continuing operation, as an interim measure, of bottle reclamation and recycling programs at glass container production locations throughout Canada. Glass container manufacturers purchase all used bottles and jars that are brought to such reclamation centers by individuals and non-profit organizations. The payment for redeemed glass is one-half cent per container or \$15 per ton. Bottles must be sorted by colour, be reasonably clean and free of metal contamination. The objectives of this interim program are:

- a) To demonstrate the recyclability of glass containers;
- b) To produce a meaningful volume of used container glass for development of recycling techniques for the manufacture of new glass containers and secondary products;

c) To demonstrate to the public and government that the glass container industry recognizes the urgency of the solid waste problem and is taking immediate steps toward solutions;

d) To provide individuals and community groups in areas close to glass container plants the means of participating in the reclamation and recycling effort.

6 — Encouragement and support of legislation at the federal, provincial or local levels that will advance attainment of these objectives in the solid waste management field.

7 — Unequivocal opposition to any solid waste or litter oriented legislation that discriminates in any way against any individual segment of solid waste or litter.

Litter prevention

The glass container industry as the result of many years of involvement in litter prevention activities is firmly dedicated to the concept that effective litter control can be attained only through a three-point program of:

1 — Public education

2 — Enactment and enforcement of adequate anti-littering laws.

3 — Provision of adequate devices for collection and disposal of litter — machines for picking up litter, trash receptacles, litterbags and the like.

The industry is equally firm in its conviction that littering cannot be controlled through legislation that outlaws, discriminately taxes or otherwise restricts the use of specific containers or other products that may appear as part of litter.

The industry is further convinced, as in the case of solid waste management, that meaningful solutions to the litter problem lie in cooperation between government, industry and the public.

Government's responsibilities include:

- 1 — Enactment and enforcement of adequate anti-littering laws.
- 2 — Provision for and servicing of sufficient litter receptacles along streets and highways, on beaches, in parks and other public places.
- 3 — Removal of litter from streets, highways and other public property.
- 4 — Conduct, in cooperation with industry and civic groups, of educational programs designed to dissuade people from littering.

The responsibilities of industry include

- 1 — The sponsorship of its own, and in cooperation with civic groups and government, of educational programs to stop littering by the public.
- 2 — Cooperation with and encouragement of litter prevention organizations at the national, provincial and local levels.
- 3 — Encouragement of provincial and local government in their efforts to enact and enforce anti-littering laws.

The responsibility of the public is:

- 1 — To refrain from littering.
- 2 — To cooperate with and encourage government and industry in the broad spectrum of litter prevention activities.

The glass container industry is committed to implement these basic policies in the litter prevention field through the following activities:

- 1 — Support of Keep Canada Beautiful and Littercheck through money and service contributions;
- 2 — Support of provincial and local litter prevention organizations;
- 3 — Promotion of the industry's bottle reclamation program as a means of reducing the volume of glass in litter and to serve as an educational device to discourage people from littering in the first place;
- 4 — Continuing implementation of the Glass Container Council Litter Prevention Program in which Council members engage in a variety of litter prevention and clean-up projects in their plant communities;

- 5 — Continuation of dialogue and communications with government and the public to create better understanding of how the litter problem can best be resolved and of what the glass container industry is doing to this end.
- 6 — Support of strong anti-littering legislation at the provincial and local levels.
- 7 — The conduct or sponsorship of research that will contribute to development of more effective litter control or removal techniques..
- 8 — Cooperation with government, litter prevention organizations and other industry groups in the development and execution of programs that seek to solve the litter problem through the principles of the "three E's" — education, enforcement, equipment.

Glass containers are the most readily recyclable and the most environmentally compatible of all modern packages used by North American consumers. Most of today's new bottles and jars are made with up to 25 per cent recycled container glass.

Used glass containers are also capable of being recycled into many other useful products.

Glass, nature's own material, is chemically stable, does not decompose, rot, rust, degrade or putrefy and cannot pollute the air, the water or the land — regardless of whether it is littered, dumped, buried or incinerated.

Even without recycling, the manufacture of glass containers holds no threat to the earth's natural resources. The basic ingredients of virgin glass are sand, soda ash and limestone. These abound in nature. In fact, they are the major constituents of the earth's crust.

Imperviousness to chemical and bacteriological action is one of the characteristics that makes glass the most effective packaging material for protecting many consumer products, particularly medicines, beverages and foods.

These same characteristics make glass containers the ideal ecological package.

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